Executive Order G-70-150-AD

Exhibit 2

Specifications for the VaporVac Bootless Nozzle System

Figures 2A-1 through 2A-4 contain drawings of a typical installation of the VaporVac system. Figure 2B-1 depicts the location of component parts of the VaporVac system. Figure 2B-2 depicts the dispenser types approved for use with the VaporVac system.

Nozzles

1. Failure mode testing demonstrated that blockage of some of the vapor collection holes in the spout of the nozzle has negligible effect on the operation of the system until the number of unblocked holes is less than required below.

Nozzle Manufacturer	Minimum Number of Unblocked Vapor Holes Required
OPW	4
Husky	1
Emco Wheaton	3

Any nozzle which is found to have fewer unobstructed vapor collection holes than are required is defective and shall be immediately removed from service.

2. Nozzles shall be 100 percent performance checked at the factory, including checks of all shutoff mechanisms.

3. Leaded and unleaded spouts are interchangeable.

Dispensing Rate

1. The the dispensing rate for installations of the VaporVac System shall not exceed 10.0 gallons per minute when only one nozzle associated with the product supply pump is operating. This shall be determined as specified in Exhibit 4.

Vapor Valves

1. The VaporVac system is equipped with solenoid vapor valves. The maximum allowable leak rate for new vapor valves shall not exceed the following:

   0.038 CFH at a pressure of two inches water column (2" wc), and
   0.005 CFH at a vacuum of twenty seven inches water column (approx 1 psi).

2. The vapor valve ensures proper operation of the system and prevents the ingestion of air into the system. Any defective vapor valve shall be immediately removed from service.

The integrity of the system shall be restored by replacing the vapor valve or otherwise closing the vapor path as soon as practicable.

3. Sealing of the vapor holes on the nozzle spout (such as placing a balloon or the fingers of a glove over the holes on the nozzle spout, or bagging nozzles) is **not** permitted during static pressure decay tests. Sealing of the nozzle vapor holes during a static pressure decay test may mask a defective vapor valve.

Inverted Coaxial Hoses

1. The length of hose which may be in contact with the island and/or ground when the nozzle is properly mounted on the dispenser is limited to six inches (6").

2. The maximum length of the hose shall be fifteen feet (15').

Breakaway Couplings

1. Breakaway couplings are optional but, if installed, only CARB certified breakaways may be used. Breakaway couplings which do not close the vapor path may be used because the VaporVac solenoid valves close the vapor path when breakaway couplings are separated.

VaporVac System

1. The normal operating range of the system, as measured by air-to-liquid (A/L) ratio testing, is 1.10 plus or minus 0.10 (1.00 to 1.20). The A/L ratio of the system shall be measured at a flowrate between six and ten gallons per minute (6 - 10 gpm). Any fueling point not capable of demonstrating compliance with this performance standard shall be deemed defective and removed from service. The A/L ratio shall be determined by the CARB-approved test procedure (TP-201.5). Alternative test procedures may be used if they are determined by the Executive Officer, in writing, to yield comparable results.

   The inclusion of the liquid shutoff aspirator will increase the A/L ratios. Whenever possible, it is recommended that the aspirator contribution be excluded, because this volume is injected into the product stream and does not go through the vapor pump. The design of the Husky nozzle makes it impossible to exclude the aspirator contribution. When the A/L ratio measurements include the aspirator, the allowable range shifts upward (increases) by the following amounts:

Flowrate (gpm)	A/L Ratio Increase
6.0	0.04
8.0	0.03
10.0	0.02

   NOTE: This test procedure returns air rather than vapor to the storage tank, and normally causes an increase in storage tank pressure which may result in vent emissions. This is a temporary condition due to the test and should not be considered an indication of malfunction or noncompliance.

2. The VaporVac shall be equipped with electronic safeguards designed to ensure that no fuel is dispensed unless the VaporVac system is operating properly. An error code is

indicated on the sales display of the dispenser which identifies the problem as being related to the VaporVac system.

The following conditions shall halt or inhibit the operation of the one side of the dispenser, with an error code indicated, while allowing the other side to operate.

- Excessive vapor pump motor current (possible causes include bearing failure, locked rotor, motor winding shorts or fluid in pump cavity for more time than required to clear a blockage).

- Failure of the vapor pump to start while fuel is being dispensed (possible causes include control electronics failure, disconnected or severed motor wiring, or locked rotor).

- Vapor pump activity during idle periods when no fuel is being dispensed.

- Maximum permissible pump speed exceeded (possible causes include loose connections in vapor path or pump malfunction).

- Disconnection or accidental swapping of Side A/B vapor pumps.

The following conditions shall shut down the entire dispenser in a manner similar to a "dead-man switch", in that the VaporVac system must actively prevent its activation. This is achieved by requiring the VaporVac system to maintain a normally-closed switch, which will open should the VaporVac system be taken "off-line" via various mechanisms.

- Failure or loss of the VaporVac power supply.

- A.C. line fuse opens.

- Cabling/wiring missing or disconnected (tampering).

Pressure/Vacuum Valves for Storage Tank Vents

1. A pressure/vacuum (P/V) valve shall be installed on each tank vent. Vent lines may be manifolded to minimize the number of P/V valves and potential leak sources, provided the manifold is installed at a height not less than 12 feet above the driveway surface used for Phase I tank truck filling operations. At least one P/V valve shall be installed on manifolded vents. If two P/V valves are desired, they shall be installed in parallel, so that each can serve as a backup for the other if one should fail to open properly. The P/V valve shall be a CARB-certified valve as specified in Exhibit 1. The outlets shall vent upward and be located to eliminate the possibility of vapor accumulating or traveling to a source of ignition or entering adjacent buildings.

2. The P/V valve is designed to open at a pressure of approximately three inches water column (3" wc). Storage tank pressure which exceeds 3" wc for more than a short time may indicate a malfunctioning pressure/vacuum vent valve.

Vapor Recovery Piping Configurations

1. The recommended maximum pressure drop through the system, measured at a flow rate of 60 SCFH with dry Nitrogen gas, is 0.02 inches water column (0.03 inches wc at 60

SCFH if the measurement includes an impact valve). The maximum allowable pressure drop through the system shall never exceed one/half inch (0.5") water column at 60 SCFH. The pressure drop shall be measured from the dispenser riser to the UST with the pressure/vacuum valves installed and with the poppeted Phase I vapor connection open.

Note: The A/L test may be used to verify proper operation of the system, in lieu of measuring the pressure drop through the lines, provided that at least two gallons of product is introduced into the system at the termination of the vapor return lines, prior to the test.

2. All vapor return lines shall slope a minimum of 1/8 inch per foot. A slope of 1/4 inch or more per foot is recommended wherever feasible.

3. The dispenser shall be connected to the riser with either flexible or rigid material which is listed for use with gasoline. The dispenser-to-riser connection shall be installed so that any liquid in the lines will drain toward the storage tank. The internal diameter of the connector, including all fittings, shall not be less than three-fourths inch (3/4").

4. All vapor return and vent piping shall be installed in accordance with the manufacturer's instructions and all applicable regulations.

5. No product shall be dispensed from any fueling point associated with a vapor line which is disconnected and open to the atmosphere. If vapor lines are manifolded, this includes all fueling points in the facility.

6. The recommended nominal inside diameter of the underground Phase II plumbing is as indicated in Figures 2A-1 through 2A-4. Smaller vapor lines are not recommended but may be used provided the pressure drop criteria specified above are met. The vapor return lines shall be manifolded below grade at the tanks as indicated in the figures.

   Exception: For installations with a vapor return line directly to only one tank, and for which a manifold on the tank vents will be used to provide part of the vapor return path to other tanks, the vent manifold may be used as an alternative to the underground manifold only in existing installations where the vapor piping is already installed, and shall not be used in "new" installations where vapor piping is being installed. For installations with dedicated vapor piping directly to each tank, the vent manifold is approved for both new and existing installations and an additional tank manifold below grade is optional but not required.

Phase I System

WARNING: Phase I fill caps should be opened with caution because the storage tank may be under pressure.

1. The Phase I system shall be a CARB-certified system which is in good working order and which demonstrates compliance with the static pressure decay test criteria contained in Exhibit 3 of this Order. Coaxial Phase I systems shall not be used with new installations of the system. Replacement of storage tanks at existing facilities, or modifications which cause the installation of new or replacement Phase I vapor recovery equipment, are considered new installations with regard to this prohibition. An exception to this prohibition may be made for coaxial Phase I systems CARB-certified after January 1,

1994, as compatible for use with Phase II systems which require pressure/vacuum vent valves.

Where installation of the Gilbarco VaporVac system is made by retrofitting previously installed equipment, local districts may elect to allow existing coaxial Phase I systems to remain in use for a specifically identified period of time provided the following conditions are met:

- the existing coaxial Phase I system is a poppeted, CARB-certified system capable of demonstrating compliance with the static pressure decay test as specified above; and

- installation of the Phase II system requires no modification of the UST(s) and/or connections.

2. Spill containment manholes which have drain valves shall demonstrate compliance with the static pressure decay criteria with the drain valves installed as in normal operation. Manholes with cover-actuated drain valves shall not be used in new installations (as defined above). Manholes with cover-actuated drain valves may remain in use in facilities where installation of the Gilbarco VaporVac system does not require modification of the tank fittings provided the facility demonstrates compliance with static pressure decay test criteria both with the cover open and with the cover closed.

3. The Phase I vapor recovery system shall be operated during product deliveries so as to minimize the loss of vapors from the facility storage tank which may be under pressure. Provided it is not in conflict with established safety procedures, this may be accomplished in the following manner:

   - the Phase I vapor return hose is connected to the delivery tank and to the delivery elbow before the elbow is connected to the facility storage tank;

   - the delivery tank is opened only after all vapor connections have been made, and is closed before disconnection of any vapor return hoses; and

   - the vapor return hose is disconnected from the facility storage tank before it is disconnected from the delivery tank.

5. Phase I deliveries shall be accomplished so as to ensure that there is at least one vapor connection between the cargo tank compartment headspace and the storage tank associated with the product delivery. There shall be no more than two product hoses used with one with one vapor hose connected, and no more than three product hoses used with two vapor hoses connected.

6. Storage tank vent pipes, and fill and vapor and manhole tops, shall be maintained white, silver or beige. Colors which will similarly prevent heating of the system due to solar gain may also be used, provided they are listed in EPA AP-42 as having a factor the same as or better than that of the colors listed above. Existing facilities which were installed before April 1, 1996, must be in compliance with this requirement no later than January 1, 1998. Manhole covers which are color coded for product identification are exempted from this requirement.